

**Final Proposal for  
Federal Columbia River Power System (FCRPS)  
Summer Juvenile Bypass Operations**

**US Army Corps of Engineers/Bonneville Power Administration**

June 22, 2004

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## **Final Proposal for FCRPS Summer Juvenile Bypass Operations US Army Corps of Engineers/Bonneville Power Administration**

This final proposal for summer spill operations is the result of the combined efforts of Bonneville Power Administration (BPA) and the U.S. Army Corps of Engineers (Corps) to work with the region to provide the same or better biological benefits to affected fish as the current summer spill operations. It reflects a significant amount of effort to listen and respond to the concerns of the region since our preliminary proposal March 30.

Our final proposal is to initiate a one-year reduction in summer spill operations, accompanied by a package of mitigation actions that we estimate will provide the same or better benefits for listed salmon as in 2000 Biological Opinion for FCRPS Operations (BiOp.) We also believe the proposal provides equal or better benefits to non-listed salmon as occur under the 2000 BiOp's summer spill regime. We will continue to pursue possible additional mitigation actions, or offsets, for potential summer spill reductions in 2005 and 2006.

The citizens of the Pacific Northwest want healthy salmon in our rivers, and there is a wealth of technical knowledge on how to achieve that. BPA and the Corps have worked closely with states, tribal, and NOAA Fisheries technical experts. We have coordinated our analysis of both the impacts and the proposed offsets with these technical experts. Their input has been extremely helpful in analyzing and expanding the options and ideas and developing this proposal. We met with people throughout the region that will be affected by the proposal and negotiated with interested stakeholders. This coordination has helped to produce a package that better addresses the needs of fish and takes into account the multiple uses of the FCRPS.

The analysis represents our best effort to inform our decision with clear and open application of the best available scientific information. We believe our estimates are well reasoned and reasonable. It should also be noted, however, that the analysis of both the impacts of summer spill and the offsets we are proposing includes uncertainty, and we cannot predict a specific level of effect in either case.

### **I. Overview of Changes to the Preliminary Proposal**

On March 30, 2004, BPA and the Corps (the federal action agencies) issued a joint preliminary proposal for summer spill operations on the FCRPS. The federal action agencies proposed a three-year (2004-2006) program of summer spill reductions and mitigation actions. Because the agencies' proposed mitigation actions offset only a portion of the projected impact, the agencies proposed to release an addendum that included actions that would fully mitigate for the estimated impacts on salmon and steelhead. To help in this effort, we asked for ideas about additional offsets that would be feasible and beneficial. The agencies also submitted the preliminary proposal to NOAA Fisheries for an analysis of the impacts and the projected benefits of the offsets. On June 8, we released an amended proposal that was followed by another one-week comment period and a public meeting June 14 with state and tribal executives.

Combined, we received over 500 comments on the two proposals. Many of the comments suggested specific offsets that would address the affected stocks. We also received comments on the two offsets the agencies had specifically described and analyzed – Northern Pikeminnow Management Program (NPMP) augmentation and Hanford Reach anti-stranding operation – and input on a list of potential additional offsets included in the preliminary proposal.

We also received extensive comments on our analysis of the expected impacts on salmon and steelhead that are migrating through the system during the period of the summer spill operations. NOAA Fisheries conducted an analysis of the projected impacts of the preliminary proposal on Endangered Species Act (ESA) listed fish, and the Columbia River Intertribal Fish Commission (CRITFC) initiated its own analysis. We discussed and used all of this information extensively in developing this final proposal.

This coordination has led us to revise our analysis of the impacts and to modify both the proposed spill reductions and the package of offsets we are proposing. Ultimately, it has resulted in our scaling back our original proposal for summer spill reductions and to be more conservative in favor of the fish in making our determination that the estimated benefits of the offsets exceed the estimated impacts of the spill reduction over a range of conditions and assumptions.

## II. Proposal for summer spill operations

We have amended the proposed summer spill operation to reflect the changes in our impacts analysis and the revisions to the package of offsets proposed. Specific spill operations are shown in Table 1, below.

**Table 1: Specific 2004 Spill Proposal**

	BiOp Spill	Proposed Operation			
		July 1-15	July 16-31	August 1-25	August 26-31
Ice Harbor	45 kcfs day, 120% TDG night	Test <sup>1</sup>	BiOp spill		No spill
John Day	30% of river flow, 24 hrs	BiOp spill			No spill
The Dalles	40% of river flow, 24 hrs	BiOp spill		No spill	
Bonneville	75 kcfs day, 120% TDG night	Test <sup>2</sup>		No spill	
<sup>1</sup> Alternate BiOp spill and 45 kcfs spill, 24 hours <sup>2</sup> Alternate BiOp spill and 50 kcfs spill, 24 hours					

As with the March 30 proposal, we are proposing to retain most of the BiOp spill operation in July. Fish passage indices over the past nine years at Bonneville, John Day, and McNary Dams show that the majority of the juvenile fall Chinook run at large passes in

July. The one change from BiOp spill in July is to conduct research on the survival benefits of a new spill passage technology under two different spill conditions at Bonneville Dam.<sup>1</sup> Testing alternative spill operations will also occur at Ice Harbor Dam until July 15.

In August, we are proposing to continue spill through August 25 at Ice Harbor and John Day Dams. There would be no spill in August at The Dalles and Bonneville Dams. There are significantly fewer fish outmigrating in August, and many fish are collected and transported at Lower Granite, Little Goose, Lower Monumental and McNary leaving fewer fish migrating in the lower river. Also, over the years the federal agencies have implemented many improvements at lower river dams to increase juvenile fish survival.

Among the options we considered for the proposed operation was to continue BiOp spill at all four projects until some time in August and then stop all spill. However, we believe this proposal to continue BiOp spill at Ice Harbor and John Day through late August presents less risk to fish. At Ice Harbor, there are more listed Snake River fall Chinook in the river to benefit from spill than at the other three projects. At John Day, project survival estimates indicate that this dam causes about 2/3 of the impact to listed fish in the lower river.

In the following sections, we describe our best estimate of the impacts of this proposal, and the benefits of the actions, or offsets, we propose to address the impacts of the proposed spill reduction. The first section describes the impacts and offsets for ESA-listed fish, which are exclusively wild Snake River fall Chinook. The second section addresses the impacts and offsets for hatchery and natural fish that are not listed under the ESA, but which fall within the scope of the Northwest Power Act.

### **III. ESA-Listed Snake River Fall Chinook**

Table 2 shows the estimates of impacts and benefits of the proposal for ESA-listed fish for a range of scenarios.<sup>2</sup> The analysis used two different sets of assumptions, a low impact case and a high impact case, in each of three different migration timings – early, middle and late. (Migration timing will affect the impacts of the operation and can affect the effectiveness of the offsets as well. For instance, additional water from the lower Snake River in July, as described below, will only affect those fish that are migrating in July.)

As described below, the estimated benefits of the offsets exceed the estimated impacts in every scenario. Pikeminnow removal provides additional benefits that are not counted, per the explanation below.

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<sup>1</sup> This evaluation has been coordinated through Corps' Anadromous Fish Evaluation Program (AFEP) regional process and is scheduled to begin June 20.

<sup>2</sup> In reviewing these values it must be kept in mind that the confidence intervals around these estimates far exceed the level of effect that we are attempting to estimate. The same is true of the estimated effects of the offsets. We recognize these uncertainties and wish to emphasize that these values do not represent predicted values. They do, however, document our best effort to inform our determination with a consideration of the relative magnitude of the effects and therefore the risks inherent in the reliance on offsets.

**Table 2: Estimated Juvenile Impacts & Offsets for 2004 – ESA Listed Fish**

Estimates	Early Migration Year		Middle Migration Year		Late Migration Year	
	Low Impact	High Impact	Low Impact	High Impact	Low Impact	High Impact
Impacts	-109	-268	-363	-868	-387	-927
Brownlee offset	+740	+715	+1075	+1039	+1001	+967
<b>Net Impact</b>	<b>+631</b>	<b>+446</b>	<b>+712</b>	<b>+170</b>	<b>+614</b>	<b>+40</b>
Pikeminnow offset (not included)	(+271)	(+597)	(+271)	(+597)	(+271)	(+597)

\*Total estimated run size is about 1 million smolts (juveniles). Adult returns were 5,083 in 2001; 2,095 in 2002; and 3,895 in 2003 (draft 3/10/04 compilation from Technical Advisory Committee, Columbia River Compact.) [NOAA Fisheries' interim abundance target is 2500 wild Snake River adults (April 4, 2002 letter from Bob Lohn to Council Chair Frank L. Cassidy.)]

**A. Impacts analysis**

We have put a lot of effort into vetting our impacts analysis with NOAA Fisheries, states and tribes since the preliminary proposal. We made several refinements in response to comments received and reviewed the assumptions with NOAA and CRITFC. In addition, we performed a number of alternative analyses to corroborate our estimates.<sup>3</sup> These were: an adult return-based analysis; a comparison to actual adult returns; a comparison of modeled and empirical in-river reach survival; and an analysis of different run timing scenarios. We also requested that the University of Washington's Columbia Basin Research Center perform a comparable analysis using the Columbia River Salmon Passage Model (CRiSP). (CRiSP models salmonid passage and survival through the Columbia River, its tributaries, and estuary.) The CRiSP analysis found very similar results to the SIMPAS-based analysis.

The results of our analysis, once we made these changes, were in fact very similar to NOAA Fisheries' – especially when considered in the context of the population of about one million ESA-listed smolts migrating and recent adult returns ranging from 2,000 to 5,000 wild Snake River fall Chinook. The main differences in the juvenile impact estimates are attributable to the differing treatment of uncertainty.<sup>4</sup>

Because the estimates are so similar, for purposes of this proposal, we have chosen to use NOAA Fisheries' numbers for our impacts analysis. The results of NOAA's analysis are shown in Table 2 above.

Concerns have also been raised about impacts to listed and non-listed adult steelhead and fall Chinook that may suffer increased mortality due to fallback through non-spill routes during a no-spill operation. Existing adult passage data for comparing spill versus no spill operations is extremely limited. However, we analyzed the limited available data comparing 2000, 2001, and 2002 adult escapement, which included hundreds of fish.

<sup>3</sup> See Appendix A for full analysis.

<sup>4</sup> The action agency juvenile estimate is an expected case where the majority of uncertainty is accounted for in converting to adult returns (smolt-to-adult ratio, or SAR). The NOAA estimates account for uncertainty through the juvenile calculation.

Based on this data, we have no evidence to support that the proposed no-spill operation in August would affect system-wide escapement of steelhead and fall Chinook.<sup>5</sup>

**B. Offsets for ESA-listed Snake River Fall Chinook**

In the nearly three months since we issued the preliminary proposal, the federal action agencies have actively pursued development of further offsets, many of them offsets suggested during the comment period. We put a considerable amount of effort into identifying a solid package of offsets that can provide the same or better biological benefit to affected fish as we estimate for the existing summer spill regime. Some of the proposals are innovative or complex and will need time and attention for the action agencies to work out details with involved parties to accrue offset benefits in future years. Many of them require coming to agreements with states, tribes, and utilities on a range of issues affecting not only power and fish, but recreation, cultural resources, and irrigation as well.

On the basis of the analysis described above, and with full consideration of the inherent risks and uncertainties involved in any analysis of summer spill impacts, we have determined that the package we are proposing will fully offset the impacts of the 2004 proposed operation on ESA-listed fish. Details of the potential 2005 and 2006 offsets are still under discussion and development. Some of the actions – such as technologies that improve passage at the dams – require long lead times to put into place. Some, such as pikeminnow control, will continue to accrue further benefits over time.

**Table 3: Summary of Offsets for ESA-Listed Snake River Fall Chinook**

2004	Future year(s)*
Brownlee flows in July	Additional water in Lower Snake
	Fish passage technologies
	Harvest reductions

\* under discussion; pending agreement

BPA funding for offset measures for summer spill reductions will not reduce our funding for other fish and wildlife measures, whether direct or through implementation of the Northwest Power and Conservation Council’s Fish and Wildlife Program.

**B.1. Additional water in the Lower Snake River**

Many comments supported the action agencies’ providing additional water during the migration as a way to provide for cooler water temperatures or otherwise offset the biological effects of reduced spill. The Washington Department Fish and Wildlife (WDFW) said increasing flows in the lower Snake River would be a “credible and viable” offset. The joint technical staff of the State, federal, and tribal fishery agencies said that the efficacy of this offset was “supported by fish passage data” and could provide “realistic real-time mitigation.” CRITFC also supported additional water as an effective way to increase juvenile survival. As shown in Table 2 above, NOAA Fisheries has indicated that

<sup>5</sup> See Appendix B; May 26, 2004, Corps memo.

the operation would provide an additional flow benefit for the ESA-listed Snake River fall Chinook migrating at that time.

In response, BPA has negotiated a one-year agreement with Idaho Power Company (IPC) to increase water releases from IPC's Brownlee Reservoir by 100,000 acre-feet (100 kaf) in July.<sup>6</sup> Under the one-year agreement, on June 9 BPA paid IPC \$1 million for the option to call upon an additional release of 100 kaf from Brownlee Reservoir between July 7 and 28, with weekly release volumes of at least 33 kaf – a flow increase of 2.4 thousand cubic feet per second (kcfs.) Per terms of the agreement, BPA exercised the option on June 23, and paid IPC an additional \$3 million, for a total cost of \$4 million.

Regardless of whether spill in reduced in 2004, the additional water provided under the IPC agreement is expected to provide additional benefits to outmigrating fish. NOAA Fisheries' analysis shows that the increase of 2.4 kcfs during the three-week period of the arrangement will result in an estimated 715 to 1,075 additional surviving Snake River fall Chinook smolts to below Bonneville Dam, depending on migration timing.<sup>7</sup>

State and Tribal parties raised concerns about whether this water would be drafted as part of IPC's normal power operation. In response, IPC provided to BPA copies from its internal 2004 Operations Plans of April 13, April 27 and May 11, 2004. These plans show that IPC's planned operation for Brownlee was to pass inflow during the month of July. IPC has also noted that actual operations could vary depending on customer demand, water conditions, markets and other planned events. However, absent this agreement, IPC's base planned operation, as reflected in their internal Operations Plans, was to not release any stored water from Brownlee in July.

Parties also expressed concern about the potential refill of the 100 kaf in August, which would reduce downstream flows. In a June 11, 2004<sup>8</sup> letter, IPC provided clarification about its expected August operations, indicating that “. . . IPC does not intend to replace the 100 kaf of stored water, released during July pursuant to the June 9<sup>th</sup> agreement, during the month of August.”

Finally, we undertook a rough analysis of the Bureau of Reclamation's planned release schedules from Upper Snake projects above Brownlee this summer in order to determine whether the 100 kaf from Brownlee is truly an increment above those releases. Our analysis indicates that at least 75 percent of the planned Upper Snake releases will have arrived at Brownlee either prior to July 28 or after August 31. Under our agreement, IPC must draft 100 kaf between midnight July 6 and midnight July 28 and won't be able to store any of the BOR releases during that time. (There is uncertainty as to how and/or exactly when IPC will pass through the remaining approximately 25 percent projected to arrive at Brownlee in August, but this uncertainty exists whether or not IPC drafts the 100 kaf required per the agreement in July.)

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<sup>6</sup> Contract agreement signed between IPC and BPA June 9, 2004.

<sup>7</sup> This is an estimate to illustrate the general magnitude of the potential offset relative to the potential effect. It is not a prediction of the absolute effect.

<sup>8</sup> June 11, 2004, letter from J. LaMont Keen, President and Chief Operating Officer, IPC, to Paul Norman, Senior Vice President, BPA Power Business Line.

## **B.2. Northern Pikeminnow Management Program augmentation**

We anticipate benefits to ESA-listed Snake River fall Chinook as a result of our recent increase in the northern pikeminnow removal program; however, this proposal does not claim any additional benefits for these listed fish from this action. Since our preliminary proposal, NOAA Fisheries has found that the BiOp may already contemplate continuing improvements to predator control actions (such as increasing the bounty for pikeminnow), and the BiOp jeopardy analysis may incorporate the estimated benefits of those improvements. Thus, NOAA Fisheries' analysis concludes that increased pikeminnow removal does not increase benefits to listed wild Snake River fall Chinook beyond what is already expected in the BiOp. Despite what the BiOp may have contemplated, it is clear that BPA was not intending to increase funding for the pikeminnow removal program prior to this summer spill proposal and that the projected benefits of the increased predator control would therefore not have occurred in 2004.

## **B.3. Potential offsets for FY2005-06**

**Commercial harvest reduction:** The impacts of summer spill reductions on ESA listed and unlisted juvenile summer and fall Chinook can be offset by other measures either during the juvenile or appropriate adult return years of upriver fish. Juvenile fish offsets are preferred as they directly relate to the increased juvenile mortality. Adult offsets could be used as a supplemental offset only if juvenile stage offsets prove to be insufficient.

We have been discussing with Oregon and Washington, as well as representatives of commercial fishing interests, the concept of a reduction in commercial harvest impacts that could address adults returning from juveniles affected by any 2005-06 spill reductions (adults returning in 2008, 2009 and 2010). The proposal would address potential impacts to juvenile fish by targeting part of the commercial fishery on hatchery fall Chinook, thereby reducing harvest of naturally produced fish.

We are proposing a three-stage approach to determine the viability of a selective commercial fishery and its potential as an offset to spill reductions. Under this approach, non-tribal commercial fisheries may be able to reduce their impact on listed and non-listed naturally produced fall Chinook without reducing their harvest. Between now and January 2005, BPA will facilitate discussions among fishery managers, sport, commercial and tribal fishers to discuss the concept and implementation details to determine social, biological, legal and policy support. These discussions will address fishery implications and identify selective fishing techniques, gear acquisition and research design and methodology.

If the concept is successfully developed and supported, BPA will fund a three-year study of pilot fisheries (2005-07) to investigate selective fishing gear and techniques. If pilot fisheries determine that a full or partial scale fishery application is viable and BPA funds the implementation of selective gear and harvest techniques, then this offset would proceed to full fishery implementation in 2008. Before implementation is considered, negotiated assurances would be needed to ensure fish protected by these actions were not harvested in other sport or tribal fisheries.

Because of this contingent implementation schedule, harvest reductions cannot be considered part of the 2004 offset package. If implemented proceeds in 2008, 2009 and 2010, harvest reductions may be used as an additional offset for any proposed 2005 and 2006 spill reductions.

**Accelerated installation of Removable Spillway Weirs (RSWs) and other fish passage improvements:** Recommended by fish managers in Oregon and Washington, this long-term effort would accelerate installation of RSWs and other technologies to enhance spill reductions without adverse affects on passage. WDFW recommends expedited installation of RSWs/surface bypass at McNary and Little Goose dams, followed by John Day and Lower Monumental dams, and The Dalles Dam.

The action agencies agree that surface bypass methods have the potential to provide for lower spill volumes than the current operation, with similar or better project survival. We are moving ahead on an expedited schedule to install an RSW at Ice Harbor Dam on the Snake River. We believe The Dalles Dam is a high priority in the lower river, where we are planning to install a forebay juvenile guidance device. The next Snake River priority we have identified is Lower Monumental Dam.

We have already engaged the issue of priorities with regional fish managers. We intend to continue working through the System Configuration Team (SCT) and the Fish Facilities Design Review Work Group to review the current program under the Columbia River Fish Mitigation project and to further refine priorities based on that collaboration. We will develop corresponding work plans by fall 2004 and incorporate them into the draft 2005-2009 Implementation Plan for technical input and review.

#### IV. Non-Listed Fall Chinook

Table 4 shows that, for non-listed fish in aggregate (i.e. not differentiated by individual stocks or places of origin), the estimated benefits of this proposal offset the projected impacts. This issue is described in more detail below.

**Table 4: Estimated Juvenile Impacts and Offsets for 2004 – Non-Listed Fish<sup>9</sup>**

Action	Estimated Impact **	Benefits of Offsets
Proposed summer spill operation	-130,000 to -742,000	
Hanford Reach anti-stranding		+1,094,870 to +1,287,981
Pikeminnow control		+39,252 to +84,549
Total Offsets		+1,134,122 - +1,372,530 **

\*\* Impacts estimate using “NOAA Approach,” as described below. Estimated total run size for non-listed fall Chinook is 50 million juveniles (smolts)

<sup>9</sup> After this analysis was updated to reflect comments on the March 30 proposal, the federal agencies decided to change the proposed spill operation. In the interests of a timely release of this final proposal, we have not done further updates to reflect the lower level of spill curtailment we are now proposing. Thus, the analysis overestimates the impacts of the proposed spill reduction.

## A. Impacts analysis

In the same way that we have for listed fish, we have made several refinements to the initial impacts analysis for non-listed fish in response to comments received.<sup>10</sup> Those refinements include: updating the hatchery release estimates based on actual 2003 releases; correcting some of hatchery releases numbers that had been double-counted; removing yearlings from the analysis (because they are released in the springtime and should be unaffected by the proposed summer spill change); analyzing the specific operation that is proposed; and correcting an equation within the SIMPAS model. In addition, we also performed a number of alternative analyses to corroborate our estimates.

We also requested that the University of Washington's Columbia Basin Research Center perform a comparison of fall Chinook stock survivals under the BiOp and two alternative summer spill programs using CRiSP. The CRiSP analysis found very similar results to the SIMPAS-based analysis.

Our estimated impacts for individual stocks are shown in Table 5. As footnoted above, these estimates reflect impacts of our March 30 spill curtailment proposal – which will be greater than those estimated for the lower level of spill curtailment we are now proposing.

Table 6 also shows the action agencies' range of estimates, as well as estimates prepared by CRITFC staff using the same parameters NOAA Fisheries used in estimating impacts to ESA listed fish. The low end of the action agency estimate is based on the methods and analysis coordinated within the regional forum and referenced in our March 30 preliminary proposal, with several refinements as described in Appendix A. The high end of the range for the action agency estimate represents the worst-case migration timing. The NOAA Fisheries approach uses the same methods as the action agencies', with a few different input parameters. The low impact estimate uses primarily the same input parameters with a few exceptions. The high impact estimate changes a few additional input parameters. NOAA Fisheries also estimated impacts based on early, middle, and late migration timing.

It is our view the estimates in Table 5 are very similar, especially in the context of the larger population of 50 million smolts or of recent adult returns ranging from 200,000 to 500,000 fall Chinook.<sup>11</sup>

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<sup>10</sup> A full analysis and response to comments on the impacts analysis is included as Appendix A.

<sup>11</sup> The action agency juvenile estimate is an expected case analysis where the majority of uncertainty is accounted for in the smolt-to-adult return ratio. The NOAA approach accounts for uncertainty through the juvenile calculation.

**Table 5. Summary of Range of Impacts on Juvenile Non-listed Fish**

<b>FALL CHINOOK</b>	<b>Action Agency Estimate</b>	<b>NOAA Approach</b>
<b>Upriver Bright</b>		
Priest Rapids and Ringold Hatcheries	72,000 to 172,000	25,000 to 174,000
Hanford Reach Natural	177,000 to 423,000	61,000 to 425,000
Yakima River and Marion Drain	5,000 to 10,000	5,000 to 19,000
<b>Snake River Bright</b>		
Lyons Ferry Hatchery*	1,000 to 2,000	1,000 to 8,000
Nez Perce Hatchery and Hatchery Releases at Hells Canyon	1,000 to 1,000	300 to 2,000
<b>Mid-Columbia Bright</b>		
Deschutes River	10,000 to 24,000	8,000 to 23,000
Klickitat River	13,000 to 32,000	10,000 to 32,000
Umatilla River	5,000 to 14,000	4,000 to 11,000
Little White Salmon River	7,000 to 16,000	5,000 to 16,000
<b>SUMMER CHINOOK</b>		
Upper-Columbia	18,000 to 43,000	10,000 to 32,000
<b>TOTAL Juveniles</b>	<b>308,100 to 737,700</b>	<b>130,000 to 742,000</b>
Converted to adults**	1,545 to 29,520	Not available

\* Lyons Ferry Hatchery fall Chinook are part of the Snake River fall Chinook ESU but not part of the listing.

\*\* BPA adult returns are based on a smolt-to-adult return rate (SAR) of 0.5 to 4 percent.

**B. Offsets for non-listed fish**

Table 6 gives a summary of offsets proposed for 2004 to benefit non-listed fish. Details of the potential 2005 and 2006 offsets are still under discussion and development.

**Table 6: Summary of Offsets for Non-listed Natural and Hatchery Fish**

<b>2004</b>	<b>Future year(s) *</b>
Brownlee flows in July	Additional water in Lower Snake
Hanford Reach anti-stranding	Hanford Reach anti-stranding
Pikeminnow control	Pikeminnow control
Habitat improvements for natural fish	Habitat improvements for natural fish
Hatchery actions for other fish	Hatchery actions for other fish
	Harvest reductions
	RSWs & other fish passage technologies

\* under discussion; pending agreement

The additional water from the lower Snake River, described in section B.1 above, will provide benefits to non-listed fish as well ESA-listed fish, though the benefits aren't quantified in this analysis.

BPA funding for offset measures would be in addition to BPA's other funding commitments, whether direct or through implementation of the Council's Fish and Wildlife Program. It would not result in reduction of funding to or through BPA's other funding mechanisms.

### **B.1. Hanford Reach anti-stranding operation**

Large populations of non-ESA-listed Hanford Reach fall Chinook spawn naturally in the free flowing Hanford Reach of the Columbia River below Priest Rapids Dam. Historically, these fish have been susceptible to being stranded by river flow fluctuations in the early springtime as they emerge from spawning gravels. The stranding risk is greatest when the fish are below 50 millimeters in size, less mobile, and are actively feeding in the shallow near-shore areas of this reach of river.

BPA, WDFW, the three mid-Columbia Public Utility Districts (Grant, Douglas, and Chelan), the Confederated Tribes of the Colville Indian Reservation, and NOAA Fisheries recently reached agreement on a 10-year set of protocols to limit flow fluctuations for the purpose of providing better rearing conditions for these fish. Under this agreement, Grant PUD maintains releases from Priest Rapids Dam within an agreed-upon fluctuation band. In addition, on four weekends, flow reductions are further limited so as to only be moderately below weekday levels. This reduces the incidence of stranding when these fish are small and particularly susceptible.

The weekday-to-weekend flow smoothing included in the new agreement was not implemented in previous years. In addition, the new agreement reflects a long-term commitment (10-year minimum) to the operation, included as part of BPA operating costs. As suggested by some regional parties, BPA has explored the option of an additional weekend of flow reduction restrictions with Grant PUD. Monitoring being conducted by WDFW can be used to determine if fish less than 50mm remain after the four weeks of weekday-to-weekend flow smoothing operations had passed. As part of this spill proposal, BPA used this real-time information to determine whether a minimum flow restriction should continue for a fifth weekend, and did in fact collaborate with Grant PUD to implement an additional weekend of flow smoothing the weekend of May 22-23, 2004.

In addition to the weekday-to-weekend flow smoothing afforded by the new agreement, BPA has also worked with Grant to improve implementation of its flow fluctuation limits. The result has been a marked improvement in the operation relative to previous years. In 2002 and 2003, Grant reported operating within the fluctuation limits on 74% of the days the operation was in effect. In 2004, they have operated within the limits more than 85% of the days the operation was in effect (March 21 - June 12).

Some commenters considered this anti-stranding action to be part of our existing obligations. Others, such as the WDFW and several utility organizations, supported it as an offset for Hanford Reach fish. We continue to include this in our offset proposal because the agreement we made with Grant County PUD, and are implementing this year, goes beyond our past actions both in substance and in quality. BPA had already identified

such an agreement as a possible offset for reduced spill and signed the agreement in order to provide these offsets for possible subsequent reductions in spill.

We have incorporated most of the technical comments into our analysis, which resulted in a decrease in the estimated benefits of the program. CRITFC suggested that the action agencies significantly underestimated the mortality resulting from stranding and that our estimate of impacts from the Hanford Reach agreement was thus skewed. Using CRITFC's mortality assumptions in fact resulted in higher numbers of returning adults with the analysis. We are using the original proposal's more conservative numbers.

Because the Hanford Reach and the Priest Rapids hatchery fish are linked, this offset action provides mitigation for both stocks. Other upriver brights from the mid-Columbia will also benefit from this action, including those from the Ringold Hatcheries.

### **B.2. Northern Pikeminnow Management Program augmentation**

A number of commenters supported the enhancement of the predator control program targeted at northern pikeminnow. At the same time, some questioned the benefits we estimated for this program. NOAA Fisheries, CRITFC and others commented on our assumptions about the number of starting smolts. Others noted that we had recently reduced the budget for the current pikeminnow program. In response, we have restored prior budget cuts through funding outside of the Council's Fish and Wildlife Program and further enhanced the program, but have not included the effects of the initial funding restoration in our estimate of benefits from this offset. We have addressed all of the technical comments and incorporated most into the analysis, which has reduced the estimated benefits of this offset.

CRITFC asked that we look at the benefits to individual stocks, and we have revised our analysis accordingly. The revised analysis shows survival benefits to non-listed stocks range from 0.16 percent for Snake River Brights to 0.33 percent for Mid-Columbia Bright stocks. In part because stocks in the Columbia are not transported at the same rate as Snake stocks, the benefit for Columbia stocks are somewhat larger, in both percentage and absolute terms. (The benefits were estimated using an approximately 5 percent catch rate increase over the current program. At the upper range, we projected a 20 percent increase in catch rate, or 40,000 northern pikeminnow. The analysis is included in Appendix D.)

This offset will benefit hatchery releases above Lower Granite Dam (including Lyons Ferry Hatchery, Nez Perce Hatchery, and other hatchery releases at Hells Canyon Dam), Deschutes, Klickitat, Umatilla River fall Chinook, and Upper Columbia summer Chinook.

### **B.3. Habitat and hatchery actions**

Habitat and hatchery actions can help to offset the impacts on fall Chinook stocks (including one summer stock) that may be affected by reductions in summer spill in 2004. As shown in Table 7 below, natural stocks can be addressed through habitat actions; hatchery stocks would be helped through hatchery production increases or improvements. Stocks of mixed origin (those that include both hatchery and natural spawners) would be helped by either habitat or hatchery actions, or both.

**Table 7: Use of Habitat/Hatchery Offsets for Specific Non-Listed Stocks**

<b>Stock</b>	<b>Origin</b>	<b>Habitat</b>	<b>Hatchery</b>
Upriver Bright Falls			
Priest Rapids & Ringold Hatcheries	Hatchery		X
Yakima River & Marion Drain	Mixed		tbd
Mid-Columbia Bright Falls			
Deschutes River	Natural	X	
Klickitat River	Hatchery		X
Umatilla River	Mixed		tbd
Little White Salmon River	Hatchery		X
Summer Chinook			
Upper-Columbia Summer Chinook	Mixed		tbd

**B.3(a) Hatchery production increases or improvements**

Many commenters suggested improvements or increased production at specific hatcheries. The suggestions were targeted to specific stocks affected by the proposed summer spill reduction and in many cases were enhancements to efforts already in place.

We agree that increased hatchery production and hatchery improvements could yield benefits, especially for non-listed fish. By providing additional funding for specific stocks, we can address diversity in individual river basins.

BPA will establish a hatchery fund in the amount of \$2 million to increase production at specific hatcheries, targeting stocks that are affected by the summer spill reductions (i.e., fall and summer Chinook salmon) in subbasins not benefited by other offsets. BPA and the Council will coordinate with affected hatchery managers to determine feasibility, logistics, and costs. This work would be completed in time to allow for any necessary review and approval of changes in 2004 egg take and hatchery production levels. BPA will establish a lead project manager for a single point of contact for questions and concerns, as well as to track and report on progress and expenditures.

**B.3(b) Habitat improvements**

We anticipate that habitat measures would provide benefits to affected non-listed naturally spawning populations and also complement the benefits expected from the hatchery offsets. States and tribes recommended a number of specific habitat improvements to benefit listed and non-listed fish.

We will establish a habitat fund in the amount of \$2 million in 2004 to fund habitat projects targeted at benefits to naturally spawning fish affected by summer spill reductions. The Council, in consultation with the co-managers, will recommend projects previously reviewed under its Fish and Wildlife Program and by the ISRP where additional funds may provide enhanced protection for affected stocks. Subbasin plans may provide further guidance on limiting factors and priority actions to benefit these stocks. If additional projects are considered necessary, BPA, in coordination with the Council, may solicit

targeted proposals. If additional proposals are solicited, BPA, the Corps, NOAA Fisheries, the Council, CBFWA, and the ISRP would review these proposals and recommend those projects for funding beginning in the FY 2005 field season. Projects should demonstrate capability for timely implementation.

BPA will establish a lead project manager for a single point of contact for questions and concerns, as well as to track and report on progress and expenditures. Implementers will provide quarterly reports on progress and an annual report to BPA on expenditures and accomplishments based on habitat performance metrics. BPA in turn will report periodically on implementation progress to the Corps, the Council, and the region.

#### **B.4. Other potential offsets for non-listed fall Chinook FY2005-06**

**Commercial harvest reduction:** This potential offset is described in the ESA-listed section of the proposal at III.B.3.

**Accelerated installation of Removable Spillway Weirs (RSWs) and other fish passage improvements:** This potential offset is described in the ESA-listed section of the proposal at III.B.3.

#### **B.5. Council Fish and Wildlife Program Funding**

The positive revenue impact of the implementation of this summer spill proposal would provide an opportunity to address the financial effects of the transition in BPA's budgeting and financial management approach for the Council's Fish and Wildlife Program. To address these effects, BPA would budget for an increase in the Fish and Wildlife Program of \$10 million. One-third of this amount (\$3.3 million) would be provided in FY2005 following implementation of spill reductions in 2004, with the remainder contingent on implementation of spill reductions in 2005 and 2006. This additional funding would provide for implementation of existing projects that have been reviewed and recommended by the Council and have received a positive BPA decision, some of which may benefit species affected by summer spill reductions.

### **V. Financial impacts of the proposal**

Table 8 shows the expected revenue impact of the proposal based on the expected water condition and market prices specific to July and August of 2004. (The March 30 proposal estimated the value of additional generation in using the average of 50 historical water conditions.) The range of the value of additional generation is due to application of a range of potential market values for the energy.

**Table 8: 2004 Revenue Impact of the Proposal (in \$ millions)**

<b>Value of Additional Generation in 2004</b>	<b>\$31 - \$41</b>
<b>Offsets</b>	
Brownlee flows in July	\$4.0
Enhanced pikeminnow program	\$1.5
Hanford Reach anti-stranding	\$0.1
Habitat improvements	\$2.0
Hatchery production increases	\$2.0
<b>Offsets Total</b>	<b>\$9.6</b>
Council Fish and Wildlife Program	\$3.3
<b>Total</b>	<b>\$12.9</b>
<b>FCRPS Net Revenue Impact</b>	<b>\$18.1 - \$28.1</b>

## **VI. Conclusion**

This proposal represents a significant step forward from our preliminary proposal. For 2004, we have a package that provides for a reduced level of summer spill which, when combined with a series of additional actions, achieves the same or better survival benefits for salmon as the current operation. For potential summer spill reductions in 2005 and 2006, we have coordinated with states and tribes to advance development of offsets for both ESA-listed and non-listed fish that are feasible and quantifiable. The 2004 proposal uses NOAA Fisheries' analysis of smolt impacts, which, while it contains considerable uncertainty, is nonetheless the best that can be done with the available information. Most important, we believe this package will achieve the most benefit for fish from the dollars the region invests.